REMARKS/ARGUMENTS

The Examiner is thanked for the review of the application.

Claims 3, 4, 6, 11, 12 and 14-20 remain in this application. Claims 3, 11, 12, 14 and 15 have been amended. Claim 13 has been cancelled without prejudice for the subject matter contained therein. Claims 21-23 have been added. No new material has been added.

In the Office Action dated March 17, 2008, the Examiner has objected to Claims 12 and 13 stating that "Claims 12 and 13 are objected to because of the following informalities: Claim 12 recites '…, wherein said cost model models costs for each of the at least one merchandise store'. This claim limitation would be better recited as '…, wherein the cost model models costs for at least one merchandise store'. Claim 13 has a similar problem."

Claim 12 has been amended according to the Examiner's suggestion. Claim 13 has been cancelled without prejudice to the subject matter contained therein. As such, Applicants respectfully believe the Examiner's objection is now moot.

Also, in the Office Action dated March 17, 2008, the Examiner has rejected Claims 3, 4, 6 and 11-20 under 35 U.S.C. 112, first paragraph, stating that "claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. There is a lack of structure in independent claim 3. The econometric engine and the financial engine are interpreted as being two software modules. The Specification, drawings, and claims tells what an econometric engine and a financial engine does but not what an econometric engine and financial engine is. It is unclear as to whether they are software modules or some type software application or a piece of software. Claims 15-17 have a 'coefficient estimator' which is unclear as to what it is that performs the functions in these claim limitations. The claim limitations tell what it does but not what it is. Is the 'coefficient estimator' a user or a piece of software or a mathematical algorithm or a device that performs these functions?"

New Claims 21-23 have been added to clarify 'what' the components are.

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Claim 21 states "wherein the econometric engine is a computer readable medium that has computer code thereon for performing computer implemented operations."

Moreover, Claim 22 states "wherein the financial engine is a computer readable medium that has computer code thereon for performing computer implemented operations."

Likewise, Claim 23 states "wherein the coefficient estimator is a computer readable medium that has computer code thereon for performing computer implemented operations."

Support for the added claims 21-23 may be found on page 116, line 4 to page 118, line 13 of the specification as filed, which states "a computer system 900, which forms part of the network 10 and is suitable for implementing embodiments of the present invention. FIG. 7A shows one possible physical form of the computer system. Of course, the computer system may have many physical forms ranging from an integrated circuit, a printed circuit board, and a small handheld device up to a huge super computer ... embodiments of the present invention further relate to computer storage products with a computer-readable medium that have computer code thereon for performing various computer-implemented operations. The media and computer code may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well known and available to those having skill in the computer software arts."

Applicants believe that the specification and claims adequately describes the function and form of the invention as to enable one of basic skill in the art to make the invention. Likewise, Applicants believe these additional claims resolve any concerns that the Examiner has regarding the nature of these components and, as such, render the 112 rejection moot.

Also, in the Office Action the Examiner has rejected Claims 3 and 4 under 35 USC 103(a) as being unpatentable over Dulaney (US 6,341,269) and Official Notice.

Regarding Claim 3, the Examiner stated "Dulaney discloses ... an econometric engine for ... **imputing** at least one missing data point (col. 4, line 5-col. 5, line 5); and a financial engine for receiving imputed variables from the econometric engine, receiving cost data from at least one merchandise store via the network, generating a cost model, and outputting the cost model to the optimization engine (col. 5, line 6-col. 6, line 22)." (Emphasis Added).

Additionally, the Examiner stated Dulaney discloses "wherein said cost model models costs for individual products in said each of the at least one merchandise store for a selected demand group in a selected time period, further wherein said demand group is a group of highly substitutable products (col. 12, line 1-col. 15, line 51)."

Claim 3 has been amended to recite in relevant part "a financial engine for receiving imputed variables from the econometric engine, receiving cost data from at least one merchandise store via the network, generating a cost model for at least one product, and outputting the cost model to the optimization engine, wherein the cost model models costs of the at least one product given the merchandise store, a demand group and a selected time period, and wherein the demand group is a group of highly substitutable products." Support for the amendment to Claim 3 may be found in the cancelled claim 13.

Applicants believe that Dulaney discloses the "optimization" of product inventories for stocking and shelf space utilization. See Column 1, lines 10-16. Applicants believe that Dulaney fails to mention, teach, suggest or contemplate generation of <u>optimized product pricing</u>.

In contrast, the cost modeling of the present invention, as disclosed in Claim 3, revolves around "the optimization engine [] further configured to generate a preferred set of prices." That being said, the cost modeling of the present invention differs from Dulaney in scope and methodology.

Particularly, Applicants assert that the "cost model models costs of the at least one product given the merchandise store, a demand group and a selected time period, and wherein the demand group is a group of highly substitutable products" of Claim 3 is novel over the prior art. Regarding this limitation, the Examiner cited particular passages of Dulaney; however, Applicants believe that the cited passages describe an "inventory optimization" process utilizing "brute force" computations rather than cost modeling. See Column 12, lines 1-9. For this inventory shelving optimization each "record" is sequentially processed for the number of "facings" and once the cost increases or profits drop, then it "returns the current number of facings as optimal." See Column 12, lines 1-9.

The variables utilized for the optimization appears to include a time factor and a store factor; however, "demand groups" i.e. groupings of highly substitutable products, do not appear

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in the disclosure by Dulaney. See Column 12, line 11- column 15, line 37. It should be noted that Dulaney mentions "Average Daily Demand" and "Std Deviation of Demand". See column 12, lines 12-18. It would be understandable where the Examiner believes that such demand variables relate to the "demand groups" as claimed; however, these demand variables are unrelated to the "demand group".

Additionally, Applicants believe that Dulaney does not provide "imputing" of missing data points as claimed in Claim 3. The Examiner took Official Notice that cleansing data is old and well known; however, known data cleansing techniques do not include 'imputation' of missing data. Moreover, the citation by the Examiner discusses the general overview of the 'facing optimization' process. See Column 4, line 5-column 5, line 5. After a thorough read, Applicants believe that imputation of missing data, or even data replacement, is not taught suggested or contemplated by Dulaney.

Thus, the cost modeling, as disclosed in the present invention, is novel and nonobvious over the cited prior art, as is imputation of missing data. As such, independent Claim 3 is believed allowable over the cited art, and all Claims 6, 11, 12 and 14-23 which depend there from are believed allowable for at least the same reasons.

Regarding Claim 6, the Examiner stated that "Montgomery and Rossi teach, wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable (page 414, col. 2, paragraph 2-page 415, paragraph 1)."

Applicants believe that while Montgomery and Rossi teach a method of Bayesian statistical modeling for price optimization which includes cross-elasticity, there is no mention of imputation of variables, seasonality or promotional variables. See page 414, column 1, paragraph 3 to page 415, paragraph 2.

As such, applicants believe the "wherein the imputed variables include at least one of a seasonality variable, a promotional variable and a cross-elasticity variable" of Claim 6 is novel over the cited art.

Additionally, Applicants believe it is important to mention that the 'inventory shelf facing optimization' of Dulaney differs greatly in method and purpose compared to the 'pricing

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optimizations' as disclosed in Maeda, as well as, Montgomery and Rossi. Applicants believe that this difference in function, method and purpose differentiates Dulaney sufficiently from the other prior art as to make the combination of these references nonobvious in itself. Moreover, even where one to believe that these references may be properly combined, the differences in methods and purpose would, from a pragmatic level, make the combination of such systems impractical at best, if not impossible.

Moreover, Applicants additionally assert that there is insufficient evidence of record of a motivation to combine Dulaney with Maeda or Montgomery and Rossi in a manner meeting the invention as recited in claims 3, 6, 11, 12, and 14-23.

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1734, 82 USPQ2d 1385, 1391 (2007). In *KSR*, the Supreme Court emphasized that "the principles laid down in *Graham* reaffirmed the 'functional approach' of *Hotchkiss*, 11 How. 248." *KSR*, 127 S.Ct. at 1739, 82 USPQ2d at 1395 (citing *Graham*, 383 U.S. at 12, 148 USPQ at 464). The operative question in this "functional approach" is thus "whether the improvement is more than the predictable use of prior art elements according to their established functions." *Id.* at 1740, 82 USPQ2d at 1396. The Court noted that "[t]o facilitate review, this analysis should be made explicit." *Id.*, citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be **some articulated reasoning** with some rational underpinning to support the legal conclusion of obviousness") (emphasis added).

None of the cited art disclose all of the limitations of claims 3, 6, 11, 12, and 14-23. Furthermore, even if one were to construe the disclosures of the cited art to disclose said limitations, there is no disclosure of a motivation to combine in a manner which gives the functionality of the instant invention. None of the cost modeling disclosed in the cited art functions in such a way as to facilitate generation of optimized pricing. As such, any asserted combination fails to meet the 'functionality test' outlined in *KSR, supra.*

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Regarding Claim 14, the Examiner stated "Official Notice is taken that it is old and well known in the art of inventory, sales, and merchandising to model costs as the sum of bag cost (number of bags needed and used), location inventory cost, a checkout labor cost (cost for persons checking out customers or employee costs), location receiving cost, transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost to arrive at a cost mode and the cost of running merchandise sales business."

Applicants respectfully traverse the Examiner's rejection. Particularly, Applicants assert that they believe that it is not well known in the art of <u>pricing optimization</u> to include <u>each</u> of these costs in the <u>particular combination</u> disclosed in Claim 14. Applicants respectfully require some showing that these cost parameters are 'old' and 'well known' in the price optimization field.

Barring such a showing, Applicants believe that the "cost model models costs as the sum of a bag cost, a location inventory cost, a checkout labor cost, a location receiving cost, a transportation cost, a distribution center inventory cost, a distribution center labor cost, an invoice processing cost, a location space cost, and a distribution center space cost" of Claim 14 is novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Regarding Claim 15, the Examiner stated that "Maeda discloses … a coefficient estimator, wherein the coefficient estimator generates a combined product sales model, a share model and a sales model (col. 10, lines 47-68)."

Applicants believe that Maeda does disclose generating sales models; however, Maeda fails to disclose the combined product sales model and share model. See column 4, lines 47-64; column 6, lines 43-54; and column 10, lines 47-68.

Contrary, the disclosed invention uses a sophisticated "combined product sales model" and a "share model" as well as single product "sales models". Thus, Claim 15 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Regarding Claim 16, the Examiner stated that "Dulaney discloses … wherein the coefficient estimator outputs the combined product sales model to the optimization engine, and

wherein **the optimization engine generates optimized pricing** for the products from the combined product sales model and cost model (col. 18, lines 28-51)." (Emphasis Added).

As noted above, Applicants believe that Dulaney discloses the "optimization" of product **inventories for stocking and shelf space utilization**. See Column 1, lines 10-16. Applicants believe that Dulaney appears to not mention, teach, suggest or contemplate generation of <u>optimized product pricing</u>.

In contrast, Claim 16 discloses "the optimization engine generates optimized pricing." Thus, Claim 16 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Regarding Claim 18, the Examiner stated that "Dulaney discloses ... the combined product sales model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40)."

Applicants respectfully traverse this rejection. The "data elements" used in the cited art are used to calculate a "matrix" for a "brute force" optimization for the "optimal number of facings." See column 12, line 1 to column 15, line 38. Applicants assert that the objective, function-type and variables differ between the cited art and the "combined product sales model" disclosed by Claim 18.

On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art, as well. Particularly, "$D_{i,k,t}$ = a demand for product k in demand group i in time period t ... $F_{i,k,t}$ = a fraction of the demand group i equivalent sales comprised by the product k in the time period t ... $S_{i,t}$ = an equivalent sales of the demand group i in the period t." are all not found within the "elements" disclosed in Dulaney. Thus, Claim 18 is believed novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Regarding Claim 19, the Examiner stated that "Dulaney discloses ... the sales model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40)."

As with the traversal argued above, Applicants assert that the objective, function-type and variables differ greatly between the cited art and the "sales model" disclosed by Claim 19.

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On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art, as well. Particularly, "i = the primary demand group

j = a secondary demand group

$\ldots$

B = a baseline state of product

$S_{i,t}$ = the equivalent sales of the demand group i in the period t

$S_{Bi,t}$ = an equivalent baseline sales of the demand group i in the period t

$\ldots$

$P_{i,t}$ = an equivalent price of the demand group i in the time period t

$\overline{P}_{i,t}$ = an average equivalent price of the demand group i for the time period t

$\overline{\overline{P}}_{i,t}$ = an average competitor equivalent price of the demand group i for the time period t

$M_{i,t}$ = a promotion level for the demand group i in the time period t

$X_{i,t}$ = a seasonality index for the demand group i in the time period t

γ_i = a price elasticity factor for the demand group i

ν_i = a promotion factor for the demand group i

ψ_i = a seasonality factor for the demand group i

κ_i = a seasonality-price interaction factor that measures the interaction of weighted average price deviations and seasonality for the demand group i

$\ldots$

$\delta_{i,n}$ = a time lag factor for the demand group i and the delay of n weeks

$\phi_{i,j}$ = a cross elasticity factor for the demand group i and the demand group j

$\eta_{i,t}$ = a competitive price factor for the demand group i measured with respect to the difference between the weighted average price of the demand group within the merchandise store and outside competitors

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π_i = a traffic factor for the demand group i

θ_i = a day-of-week effect for the demand group i

...

K_i = a constant associated with the demand group i" are all not found within the "elements" disclosed in Dulaney. Thus, Claim 19 is novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Regarding Claim 20, the Examiner stated that "Dulaney discloses ... the share model ... (col. 12, line 11- col. 15, line 58 and col. 16, line 16- col. 18, line 40)."

As with the previous two traversals argued above, Applicants assert that the objective, function-type, and variables differ greatly between the cited art and the "share model" disclosed by Claim 20.

On top of being a model based upon a different function type than that disclosed in the cited art, the disclosed invention includes variables not found in the cited art, as well. Particularly, "i = the primary demand group

...

$F_{i,k,t}$ = the fraction of the demand group i equivalent sales comprised by the product k in the time period t

$P_{Bi,k,t}$ = an equivalent base price of the product k in the demand group i in the time period t

$\overline{P}_{Bi,(k),t}$ = an average equivalent base price of all products other than the product k in the demand group i for the time period t

$P_{RBi,k,t}$ = a relative equivalent base price of the product k in the demand group i for the time period t

$\overline{P}_{RBi,\bullet,t}$ = an average relative equivalent base price in the demand group i for the time period t

$M_{p,i,k,t}$ = a level of promotion type p for the product k in the demand group i in the time period t

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$\rho_{i,k}$ = a relative base price elasticity factor for the product k in the demand group i

$\sigma_{p,i,k}$ = a promotion factor p for the product k in the demand group i

$\chi_{i,k,n}$ = a time lag factor for the product k in the demand group i and the delay of n

$\Lambda_{i,k}$ = a constant associated with the product k in the demand group i" are all not found within the "elements" disclosed in Dulaney. Thus, Claim 20 is novel and nonobvious over the prior art, and is believed allowable for at least these reasons.

Also, in the Office Action dated March 17, 2008, the Examiner has requested the source of formulas found in Claims 18-20 stating: "If the mathematical formulas for claims 18-20 were taken from a book, article, or other material, Applicants' are requested to provide copies of the source. If the mathematical formulas are the Applicants own formulas, evidence needs to be provided that these are the applicants' own mathematical formulas for a product sales mode, a sales model, and a share model."

Applicants, in the previous "Response to Restriction Requirement" dated December 12, 2007, submitted that generic sales model equations similar to the equation recited in Claim 18 may be sourced to formulas 7.8 and 7.8a in the referenced book *Sales Promotions: Concepts, Methods and Strategies*. (See, R Blattberg, S. Neslin, *Sales Promotions: Concepts, Methods and Strategies*, Englewood Cliffs, New Jersey: Prentice Hall, 1990.) Pertinent pages from the reference book were submitted at that time to the USPTO and are on record. Likewise, generic share model equations similar to the equation recited in Claim 20 may be sourced to formulas 7.6 and 7.7 in the referenced book *Sales Promotions: Concepts, Methods and Strategies*. (See, R Blattberg, S. Neslin, *Sales Promotions: Concepts, Methods and Strategies*, Englewood Cliffs, New Jersey: Prentice Hall, 1990.)

Nevertheless, Applicants assert that the specific form of the equations as Claims 18 and 20, as well as the causal variables used in these equations, are novel. An example is the concept and use of the base-price variable ($P_{Bi,k,t}$) within Applicants' novel equations.

In addition, the sales model equation found in Claim 19 and on page 69, line 1 of the specification as filed, is novel and unique to the Applicants.

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Applicants believe the above discussion clarifies the source of equations in response to the Examiner's request.

In sum, base Claim 3 has been amended and is believed to be allowable. Dependent Claims 11, 12, 14 and 15 have been amended and are believed to be allowable. Dependent Claims 21-23 have been added. Dependent Claims 4, 6, 11, 12 and 14-23 which depend therefrom are also believed to be allowable as being dependent from their patentable parent Claim 3 for at least the same reasons. Hence, Examiner's rejections of dependent claims 4, 6, 11, 12 and 14-20 are rendered moot in view of independent Claim 3.

Applicants believe that all pending Claims 3, 4, 6, 11, 12 and 14-23 are now allowable over the cited art and are also in allowable form and respectfully request a Notice of Allowance for this application from the Examiner. The commissioner is authorized via EFS (credit card) to charge the amount of $460.00 to cover the two-month extension fee. The commissioner is authorized to charge any fees that may be due to our Deposit Account No. 50-2766 (Order No. DEM1P004). Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at telephone number 925-570-8198.

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